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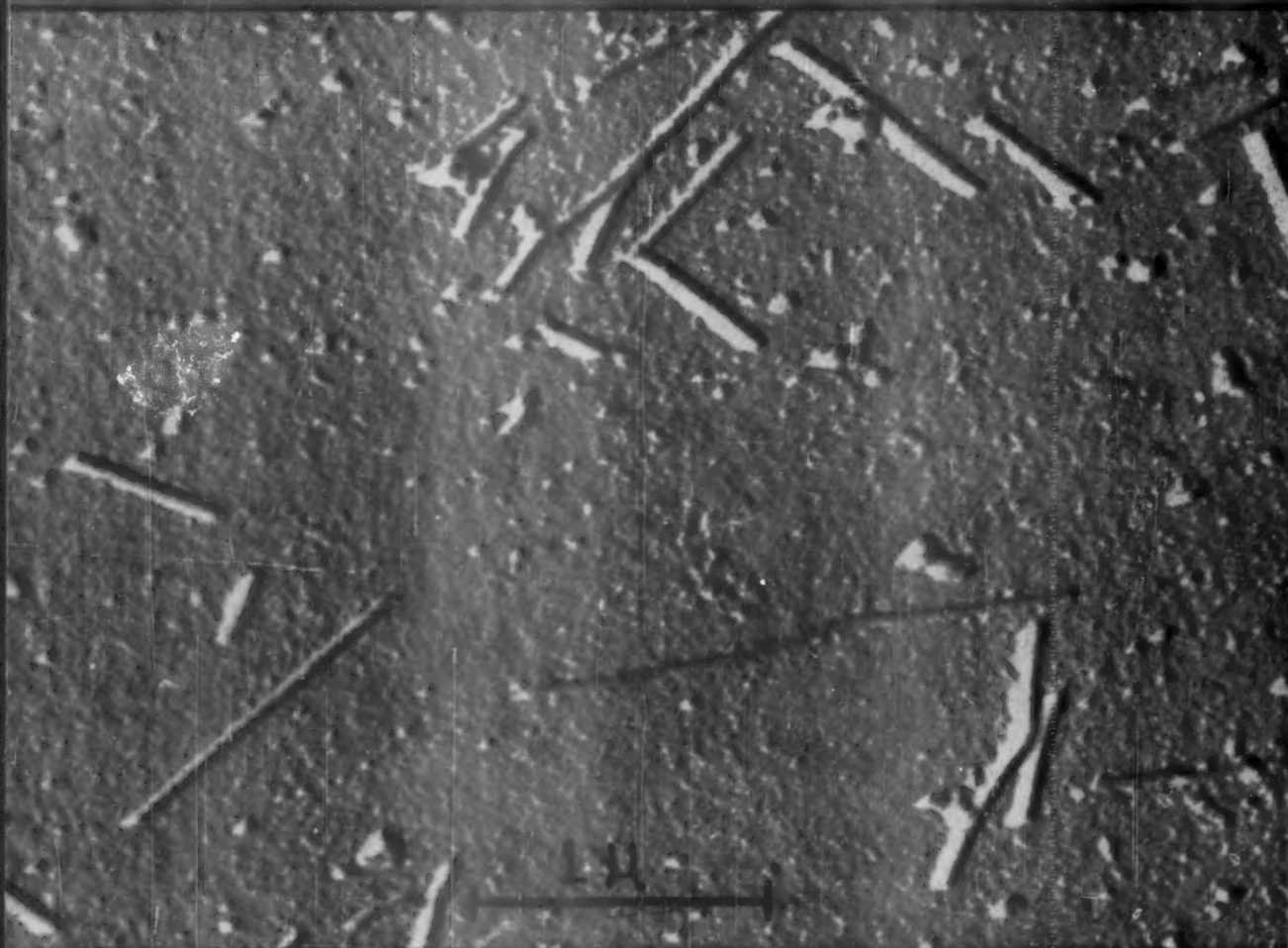
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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



New Non-Virus Protein

See Page 42

A SCIENCE SERVICE PUBLICATION

INVENTION

Patent Business Booming

Creative genius in United States is on the upswing if number of patent applications made is any indication. Nearly 8,000 more "new" ones await action this year than last.

► AMERICA'S CREATIVE genius seems to be in good health, the Patent Office observed after issuing its first group of patents for 1954.

C. L. Roberts, patents application officer, said a total of 105,303 "new" patent applications either have been acted upon by patent examiners or are awaiting the attention of the 70 specialists. This compares with a figure of 97,747 reported at the beginning of 1953.

This figure, however, does not include patents that have been referred back to attorneys for amendments that have not as yet been received. Neither does it include the thousands of patents still in the mill from past years.

Patent Examiner J. L. Brewink leads the list for 1954 with a total of 3,675 applications awaiting his initial or further attention. Mr. Brewink examines patents covering guns and torpedoes, explosives, radar, and electrical directional and distance instruments.

Examiner H. Surl comes in second with a waiting list of at least 2,148 patents dealing with natural resins, proteins, amide chemical compounds and general organic processes.

Examiner E. J. Drummond follows closely with a total of 2,141 applications for patents

on various types of metallic, paper, wooden, glass and special receptacles.

"Low" man in the list of 70 examiners is E. L. Morse who has 919 applications dealing with gadgets that push and pull, wind and reel, keep time or govern other machines by time machines, or inventions that apply to railway mail delivery.

With the first week's issue of patents, the Patent Office now has given protection to 2,665,420 mechanical, chemical and electrical inventions since it issued its first patent "Making Pot and Pearl Ashes" to Samuel Hopkins on July 31, 1790.

Although only three patents were issued that first year, the business of protecting ideas with patents caught on quickly and soon America's genius was turning out inventions at a furious pace for the times.

From 1790 to 1873, inventions patented included: Brooms, cotton gins, bedsteads, animal traps, corn shellers, school desks-and-seats door locks, fences, foot warmers, gas lights, gold washing devices, ink-stands, horseshoes, hoopskirts, patent medicines, looms, linaments, pantaloons, oil cans, printing presses, rotary steam engines, spectacles, sewing machines, street-sweeping machines, railway car spittoons, the telegraph, water wheels and washing machines.

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PUBLIC HEALTH

Cancer in Food Animals

► CANCER AFFLICTS animals on our farms and ranches, as well as human beings. Although cancerous meat is not known to be dangerous for human consumption, it is condemned by government inspectors. This cost the livestock industry an estimated \$2,500,000 to \$3,000,000 in cattle last year.

Dr. C. H. Pals, assistant chief of the meat inspection service of the U. S. Department of Agriculture, has reported that 10,235 carcasses, valued at \$250 to \$300 apiece, were condemned as food by inspectors because of malignant growths in fiscal year 1953. The total number slaughtered was 15,000,000.

In addition to these animals, cancer of the eye, or carcinoma, was found in 25,608 cattle and the heads were condemned. In these cases, the cancer was in an early stage and restricted to the head.

Lesser numbers of animals were condemned in other species. Only 1,638 out of 57,000,000 hogs were condemned.

Dr. Pals said no scientific research has

ever established that cancerous meat is injurious to humans. The meat is condemned because "the public would probably not want to eat such meat and it seems wise to take no chances with a disease like cancer where there is so much unknown."

An additional factor considered is that usually, by the time they are slaughtered, the animals are in poor condition because of the disease.

The incidence of cancer in meat animals is much less than in man. One important reason for this is that animals are usually slaughtered before or just after reaching maturity. Cancer has a much higher incidence among older humans than younger.

Dr. Pals pointed out that meat inspectors do not attempt to classify the cancers they see in meat. He reported that the largest number of carcasses condemned were from animals in which cancer of the eye had spread to other parts of the body. This condition is known as metastasis.

Veterinarians in the Department of Agriculture are doing research on these cancers

in an attempt to reduce the economic loss. They have reported that, in many respects, the cancers they have found in animals resemble those cancers that are known to humans.

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BOTANY

Plant Root Takes in Minerals Just Above Tip

► BOTANISTS USED to be puzzled as to how a plant or tree could absorb sufficient mineral nutrients through its root tips. Now it appears that the plant actually does not rely on the tips; instead absorption occurs higher up in the more mature regions of the root, where root hairs are present.

In experiments by Drs. H. H. Wiebe and P. J. Kramer, botanists at Duke University, radioactive nutrients, such as phosphorus and strontium, were supplied to barley roots at various distances above the tips. By exposing the roots to ordinary photographic film, Drs. Wiebe and Kramer were able to get pictures showing the distribution of these mineral nutrients.

These pictures, or autoradiograms as they are called since the radioactive plants are really taking photographs of themselves, showed, on a black background, a bright area in the root zone proportional in size and intensity to the amount of radioactive mineral present.

When only the root tip was supplied with the mineral nutrients, the resulting photograph showed a bright area only around the tip, indicating that the nutrients had not moved up the root to other parts of the plant. When, however, the radioactive minerals were supplied to a section of the root about an inch higher up, the autoradiograms showed that the minerals were distributed throughout the plant.

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ENTOMOLOGY

Developing Corn Resistant to Borer

► CORN STALKS scorned by the Southwestern corn borer may be the foundation of the development of a borer-resistant corn. This would bring corn farming back to areas devastated by the borer in the past.

Dr. Herbert Knutson, entomologist at Kansas State College, has found that fewer girdled and fallen stalks of corn are seen in plots planted with seed from stalks that borers started to enter but left.

This means the development of borer-resistant corn is a distinct possibility, Dr. Knutson commented.

A major pest in Kansas, Oklahoma and Texas, the Southwestern corn borer has forced some areas to abandon corn production. It also affects crops in New Mexico, Arizona, Arkansas, Missouri and Nebraska.

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PUBLIC HEALTH

'Flu Epidemic Doubted

Military stations have been alerted to inform Washington concerning an outbreak of respiratory diseases. There has been no proved epidemic of 'flu since last August.

► WE MAY get through this winter without a big epidemic of influenza.

It is still early to be sure about this, but occasionally we do have years with little or no influenza. And it can be said, on the basis of reports to authorities in Washington, that so far there has been no epidemic influenza in this country. Nor has there been any proved influenza epidemic anywhere around the world since last August when an outbreak of influenza B was reported in Australia.

Best places to pick up first signs of the start of an influenza epidemic are installations of the Armed Forces. This is because such close watch is kept over the health of the servicemen and women.

Army, Navy and Air Force medical officers at stations in the United States are under orders to report to the Surgeons General in Washington by telegram any outbreak of any respiratory disease, which includes influenza and influenza-like sicknesses. They are also required to take blood samples for tests to confirm diagnosis.

Among civilians, many never call a doctor when sick with influenza, and most cases, even when seen by physicians, are diagnosed on the basis of symptoms without confirming blood tests.

So far, although some 500 blood samples have been examined by Army, Navy and Air Force medical men, only two or three were positive for influenza and no two of those were in one place. None of these were in stations where respiratory outbreaks had occurred, and no influenza virus was isolated.

One state, and only one so far as is known, makes regular checks to pick up first signs of a 'flu outbreak among civilians. This is California which has about a dozen "listening posts" over the state. Scientists at these posts watch for increased absenteeism among school children and at industrial plants. They try each week to get blood samples to test for increase in influenza-fighting antibodies, which would indicate a 'flu virus had been around.

So far, only one of at least 150 civilians tested showed any antibody rise. No virus was found in this case.

Predictions about influenza are always risky. Sometimes an epidemic of 'flu is upon us before we know it. Only later, after checking over reports, health authorities realize that it had started without the first signs being recognized.

Influenza epidemics have occurred in the United States as early as November and as late as March or April. Last winter's outbreak started in December. The year before, 'flu broke out in Europe in Decem-

ber and reached epidemic proportions here at the end of January.

What will happen by the end of January this year is still anybody's guess, but the signs now are hopeful.

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ORNITHOLOGY

Riced Suet Pleases Birds as Winter Food

► AN OLD tried-and-tested bird food, suet, in a form that looks like kernels of cooked rice is being used at the Cornell Bird Feeding Station, Ithaca, N. Y.

As a part of the study on the food habits of birds, Prof. A. A. Allen, Cornell University ornithologist, processed suet through a meat grinder and made it look like cooked rice.

It took only two days for this food to become more popular than even sunflower seeds. Since suet is plentiful now and the price is low, the Cornell ornithologists suggest it is worth trying this new way of serving it.

Because birds are creatures of habit, Prof. Paul P. Kellogg of Cornell warns that in

other localities birds may not readily accept this new form of an old food.

Cornell ornithologists have found that many birds in one locality have learned to like dried raisins, but 50 miles away this choice and expensive bird food goes begging. Sometimes it requires a long period of training before a new food is accepted.

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MEDICINE

New Drug Treats Petit Mal Epilepsy

► DOCTORS NOW have a new drug for treating patients with petit mal epilepsy. The drug is a succinimide chemical which its manufacturers, Parke, Davis and Company of Detroit, have tradenamed Milontin.

Trial in 1,000 cases in the United States and England showed it gives complete control in 10%, practical control in 40% and no benefit in 50%, Dr. Elwood A. Sharp, director of clinical investigation for the firm, has reported.

Lack of toxic effects, such as drowsiness, nausea and vertigo are among the advantages of the drug. It was developed by a chemical-biological team composed of L. M. Long, G. M. Chen and C. A. Miller.

Petit mal epilepsy though not producing the marked and severe convulsions of grand mal epilepsy, is nevertheless disabling, since it may strike as many as 100 times a day.

It is more prevalent in children than the grand mal form and if not checked may lead to behavior problems or the child may eventually show mixed forms of epilepsy.

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GERM-FREE STUDIES—Drs. Morris Wagner (left) and Philip Trexler of Notre Dame's Lobund Institute examine a rat living a germ-free existence. Fed sterilized diets, the animals showed no tooth decay. (See SNL, Jan. 9, p. 19.)

SOCIOLOGY

Family Size vs. Social Rise

► THE SMALL families of parents moving up in the social scale are directly related to this upward social rise, Dr. E. Digby Baltzell of the University of Pennsylvania has concluded.

His finding is based on a study of the number of children of 770 Philadelphians listed in Who's Who in America in 1940. In this group, he compares the number of children of 226 persons also listed in the Social Register with the 544 not listed there.

Persons listed in the Social Register are more likely, on the whole, to have high social-class positions and less social mobility than those who have achieved their high occupational status through their own efforts, he reported.

Those listed in the Social Register also report larger families than the 544 persons listed only in Who's Who, he found.

As parents climb higher in the social scale, the requirements of more expensive living tend to keep families small. Dr.

Baltzell points out that at the top of the social scale there is little social mobility.

There were 45 male parents in the Social Register group with parents in the 1900 register, indicating a long period of high family social position. More than 40% of these parents had four or more children, and the average was more than three.

Only 54 of the total group listed in Who's Who were women. The women also listed in the Social Register were much more likely to report marriage, and the mothers in the Social Register reported 266 children per 100 mothers as against 162 children per 100 mothers for the other group.

Pointing out that conclusions drawn from such a small study must be tentative, Dr. Baltzell emphasized that in every instance the less mobile group appeared to be more familistic. His research is reported in the *Milbank Memorial Fund Quarterly* (Oct., 1953).

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BIOPHYSICS

H-Bomb Cancer Attack

► WHETHER OR not an H-bomb is ever used as a military weapon, its special kind of hydrogen, called hydrogen-3, or tritium, may be used in an attack on cancer. Steps toward this were reported by Dr. Dietrich E. Beischer of the U. S. School of Naval Aviation, Pensacola, Fla., at a regional meeting of the American Chemical Society in New Orleans.

Tritium, which is now available to researchers in quantity, has an extremely short range of radiation, and it is this property that may make it particularly suited to the selective destruction of cancer cells, he explained. Certain chemical compounds are taken up by cancer cells more readily than by healthy cells, and if these compounds are "tagged" with tritium, the

short-range rays will reach only the cells which take up the compound, leaving the neighboring cells undamaged, he said.

Dr. Beischer described the development of a new method which detects and measures the dose of radiation emitted inside tritium-tagged tissue. The method, called a radioautographic procedure, consists in clamping the tissue to an X-ray film and thus forcing the radioactive material to take its own picture.

Tritium is especially useful for investigations of biological systems, where hydrogen plays an important part as a constituent. Substitution of the radioactive form of hydrogen in such systems permits simple and effective radioautographic study of the systems.

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GENETICS

Genes Control Cells

► DISCOVERY THAT the heredity carrying genes control the number of white cells in the blood and also reactions to anesthetics is announced by Dr. Elizabeth S. Russell of the Roscoe B. Jackson Memorial Laboratory, Bar Harbor, Me.

The findings were made on mice. Whether they apply also to humans is not stated in Dr. Russell's report. But the finding of genetic differences is considered important for future research and for choice of animals for experimentation.

Working with Dr. Russell in studies leading to the discoveries were two of the laboratory's summer college training program research apprentices, Miss Olga Budds of Flat Rock, Mich., and Gerald E. Abrams of Detroit. Both are now students at the University of Michigan Medical School.

The studies were made with healthy, purebred mice.

For years it has been known that the levels of certain white blood cells are known to rise markedly with infectious and other environmental influences. Since, however, healthy mice of one genetic strain have a higher white cell count than those of another strain, these variations are inherited.

Two main types of white blood cells, granulocytes and agranulocytes, were studied. The granulocyte cell is most commonly involved in myeloid leukemia and in the fighting of infections. The agranulocyte cell originates in the lymph glands and carries off waste materials. Different genes act on the two kinds of white blood cells.

A secondary finding of this experiment showed that there are genetic differences in the way mice of different strains react to anesthetics, they report in the *Proceedings of the Society for Experimental Biology and Medicine* (Oct., 1953.)

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GENERAL SCIENCE

Science and Society at AAAS

Drs. Detlev Bronk, Leonard Carmichael and Edward U. Condon address sessions of the American Association for the Advancement of Science on the role of scientists in society.

► **MORE SCIENTISTS** should be in positions of control in the legislative and executive branches of government and upon the boards of trustees of universities and research institutions, Dr. Detlev W. Bronk declared, speaking as retiring president of the American Association for the Advancement of Science at Boston.

Dr. Bronk, who is president of the Rockefeller Institute for Medical Research and also of the National Academy of Sciences, said in part:

Those who formulate our laws and those who administer the affairs of government deal with the problems of a scientific age. But you will with difficulty find in Congress or in Presidential cabinets trained scientists or engineers.

The great importance of science today tempts many who are not scientists to control the policies and conditions under which scientists must work.

It does not justify the inadequate representation of scientists on the councils which shape the course of science and the destiny of people in an age of science.

More scientists are needed as trustees of universities and research institutions and administrators of governmental and private organizations concerned with science and technology.

There is need for scientists in the higher level of government . . . Society needs our participation in its guidance. This we can best do by serving on the governing councils and not as mere advisers or correctors of unwise action.

The role of the scientists in the formulation of science is of especial significance in these times when the course of science is so largely influenced by financial pressures.

In these days of budget-makers, appropriation committees and fund raisers the effects of the development of science require scientists who are also men of affairs and statesmen.

Scientists should play a significant role in the formulation of national policies in these times when authoritarianism and suppression of inquiry and free discussion are threatened by the fear of change.

The continuing vigor and vitality of our nation and our sister democracies requires courageous leaders who are intellectual adventurers.

There is no place in science for timid men and women who are unwilling to defend freedom for inquiry and free, unprejudiced discussion. The furtherance of science requires courage to withstand the pressure of reactionary forces.

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► **PRESIDENT EISENHOWER'S** proposal before the United Nations for international cooperation towards the utilization of nuclear energy was unanimously commended by the council of the American Association for the Advancement of Science meeting at Boston.

"Many scientific and technical problems remain to be solved in such an undertaking," the resolution states. "Scientists throughout the world will welcome the opportunity to work together on these problems as a service in the interests of peace and a contribution to the welfare of all peoples."

"Science is a major constructive force in the world. It knows no geographical boundaries. Hence the prospect of bringing scientists from many countries together in a collaborative research and development effort in this promising area provides great hope not only for immeasurable material benefits but especially for better understanding and goodwill among nations."

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DR. GEORGE BEADLE—Newly elected president-elect of the AAAS, Dr. Beadle is chairman of the biology division of California Institute of Technology. Dr. Beadle is noted for his work with one-celled plants by which he has demonstrated that each of the individual, biochemical reactions of the cell is governed by a particular gene.

► **DANGEROUS PROGRAMS** of modern Fascism and Communism can be traced back to unproved guesses about human nature, Dr. Leonard Carmichael, secretary of the Smithsonian Institution, Washington, declared in the Phi Beta Kappa address at the American Association for the Advancement of Science meeting at Boston.

Dr. Carmichael, psychologist and former president of Tufts College, said in part:

Especially during the last century and a half science has contributed to social change and to the improvement of the lot of many of the peoples of the globe. Pure science, technology and modern medicine all have continuing social implications of great importance. Political and economic stability are needed to allow the further development of these benefits and their wider distribution throughout the world.

Can science and education help in establishing such a steady and conservative economic and political life? The answer is "Yes." To do so, however, more study than at present must be given to human genetics.

Scientific psychology also must actively investigate the limitations and special characteristics of human mental life which are inborn and which do not result primarily from environmental conditioning or cultural learning.

Some economic and political revolutionaries and reformers of the 18th and 19th centuries assumed that they knew all about the basic makeup of human nature. They said that man is born good but corrupted by a bad society. Some even thought that by upsetting established economic and political institutions a golden age could be established in one generation.

They held that men and women need not themselves try to be good and to avoid evil because a utopian society would do all this for them in a painless way.

Some of the assumptions made by those who popularized this dream have never been tested by modern science. These unproved guesses about human nature, nevertheless, underlie much of the theorizing and of the dangerous programs of modern Fascism and Communism.

A full scientific study of human genetics and of the importance of heredity in determining the limitations and the inborn characteristics of man's mental life is thus a great need of our age if we are to develop a sound social philosophy and maintain our democratic freedoms.

Better education in science, social science and especially in the humanities is important in this present age of atomic development and of dangerous international tensions. A proper study of the best wisdom of the past as given in religion and in the humanities is thus now needed in a unique way.

By such education each new generation can learn about the value scales that have

proved to be adequate in the long past of human living. Such scales can then be applied to modern problems which analysis will often show are old human questions decked-out in new clothes.

Thus man, in many ways an ancient mammal with fixed brain capacity, can learn how to maintain a conservative, democratic, law-based, social order which will nevertheless allow each individual to achieve and enjoy the fullest personal freedom of which he is capable.

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Uncritical Conformity Endangers Progress

► **UNCritical CONFORMITY** is dangerous to our progress and we have a positive duty to exercise our critical faculties, Dr. Edward U. Condon, president of the American Association for the Advancement of Science, declared in the address at the presentation of the George Westinghouse Science Writing Awards at Boston. Dr. Condon, who is research director for the Corning Glass Works and formerly director of the National Bureau of Standards, said in part:

Conformity, in the sense of uncritical adherence to some established doctrine, is a deadening thing to the scientific and intellectual growth on which progress depends. This being so, we have not merely the freedom and the privilege of critical examination of the ideas and facts and interpretations put before us for our acceptance, we have a positive duty to exercise that privilege by active use of our critical faculties, a duty without the exercise of which we cannot be said to have discharged the responsibilities of democratic citizenship.

It is this attitude toward new data and new conclusions which we find well-developed in scientific research at its best. It is this attitude which is often so sadly lacking in the politician's approach to social problems, and which is so sorely needed there even though its use in the political field is so much more difficult because of the emotional connotations of so many social problems.

It is, I am convinced, the lack of this attitude in handling political problems which more than anything retards progress in this field.

This point is not as well understood as it should be, otherwise I would not use this occasion to talk about it. I think the science writers understand it pretty well for they are the kind who themselves have a natural inclination toward scientific method.

But here at this convention I have talked with several of the working press of Boston who do not ordinarily deal with science. The kind of political misbehavior, which is being these days over-dignified by calling it anti-intellectualism, and which really represents nazi-type pressures against independent thinking and toward conformity to authoritarian doctrines, seemed to be very much on their minds.

Several of these men seemed vaguely to have the idea that the tendency of the



DR. DUANE ROLLER—Newly appointed editor of both AAAS publications, *Science* and *The Scientific Monthly*. Dr. Roller, a trustee of *Science Service*, was formerly with *Hughes Aircraft Co.* in California.

scientists toward independent critical thought was just a kind of unruliness or bad-boyism which we perhaps have to tolerate in these eccentric fellows because they are the geese that lay the hydrogen bombs and many other great and good things.

When I encounter men who think this way, I labor earnestly with them trying to get them to see that these are not just little adventitious oddities of the scientific homunculus. I try to get them to see the point I am trying to make there, that the critical questioning attitude is an essential ingredient of the scientist's method of working. Without it the method does not work.

I just came sharply up against this misunderstanding in my loyalty hearing five years ago—a really rich experience if I ever had one. The board chairman was a tired old civil servant without the slightest notion of what modern science is all about. He was turning over some notes he had made from certain raw unevaluated files and finally said to me in an accusingly questioning way, "Dr. Condon, we understand that you have at times been critical of the older ideas in physics."

At first I thought my leg was being pulled, but then I caught a glimpse of the sustained humorlessness of these tiresome proceedings, so I replied by making a stirring affirmation of truth in Archimedes' Principle and in Newton's Law of Gravitation. This seemed to satisfy them for I was not asked to take sides on the matter which brought Galileo before the Inquisition.

Clearly it would have been hopeless with those people on that occasion to try to make the point I am trying to make here on the duty of dissent. I hope it is not hopeless or even necessary here.

I think that it is interesting and instructive to observe the degree to which people

one meets have a critical questioning attitude or conversely have an uncritical conformist viewpoint.

For example, it is instructive to consider in this light young Americans who have for a time been in some degree associated with the Communists. There are some who showed an interest in the mid-thirties, and I think it is a sign of a good inquiring mind that they did so. I respect them for it more than some of those who never had a lively enough spirit of inquiry to do so.

Then they soon became acquainted with the rigid authoritarian boundaries of its doctrine and pushed it away from themselves as a thing of no value, and I respect them for this, too.

But then there is another type of ex-Communist who never as a Communist had an inquiring or critical mind, but followed the comrades in blind faith until they happened to be disillusioned. Then in a wild emotional reaction they leap from slavish adherence to Communist dogma to equally violent and passionately slavish adherence to an authoritarian anti-communism.

It is these people who are doing so much harm in America today as they eagerly play the game of the elements in Congress who have shown little respect for American principles of freedom and fair play.

In my opinion the most important contribution which science is making and in large measure has got to make to human welfare is the inculcation of the scientific attitude of objective critical analysis of complicated situations and of the ability to reserve judgment until the facts are in.

This is not a passive attitude but an active one requiring honesty and fairness combined with the eagerness and activity shown by a good newspaperman on the trail of a story.

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DR. DAEL WOLFLE—Director of the Commission on Human Resources and Advanced Training. Dr. Wolfle has now been appointed the administrative secretary of the AAAS.



CORE COMPONENT TESTED—Designed for the water boiler type of atomic energy reactor, the core component is being checked out by a scientist of North American Aviation, which built the self-contained reactor in California for the Atomic Energy Commission. Uranium 235, held in water solution in the sphere, fissions to produce a high neutron density.

ENTOMOLOGY

Kill Hardy Super-Flies

► **SUPER-FLIES** THAT laugh at DDT and other insecticides can be killed with a newly discovered chemical compound mixed in common table syrup, Dr. Willis N. Bruce, of the Illinois Natural History Survey, Urbana, has found.

The syrup-bait contains Bayer L 13/59 as a killing agent. After the syrup hardens, the flies are killed as their salivary secretion dissolves the poison-laden syrup. This method has a long-term effectiveness. Dr. Bruce reported that it continues to attract and kill flies for as long as 26 weeks.

DDT and other organic insecticides did much to control the fly population for a short time but as resistant species of flies developed, scientists began looking for other poisons which would have a similar long residual killing power.

The new compound, a di-alkylphosphate, has not yet been approved by the U. S. Food and Drug Administration for use commercially. Dr. Bruce reported, however, that the poison will not injure humans or animals in the amounts used to kill flies.

Dr. Bruce first found that Bayer L 13/59 was effective against house flies for only two or three days when used in a dilute sugar solution. But when mixed with undiluted syrup that hardens, it will kill flies throughout the entire house fly season.

In dairy barns and other buildings where the bait was applied in small amounts with a paint brush to window frames and other

favorite fly roosting places, it gave 90% to 99% control of the fly population.

Dr. Bruce pointed out that this new method should be used with screening, sanitation and other techniques of controlling the fly population for best results.

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PHYSICS

Will Build 25-Billion-Volt Particle Accelerator

► **THE U. S.** will build a 25-billion-volt atom smasher at Brookhaven National Laboratory, Upton, N. Y., the Atomic Energy Commission has announced.

Estimated to cost \$20,000,000 before completion, the giant particle accelerator will unleash, under man's control, some of the power found in the cosmic rays continuously bombarding the earth. The machine, known as an "alternating gradient synchrotron," will use the new, strong-focusing idea worked out nearly two years ago.

The strong focus results from the use of many small magnet sections, rather than the larger ones now common, to focus the whirling atomic particles. The small magnet sections act somewhat like the concave-convex mirror systems used to focus light beams. (See SCIENCE NEWS LETTER, Sept. 27, 1952, p. 197, and Sept. 12, 1953, p. 163.)

Science News Letter, January 16, 1954

• RADIO

Saturday, Jan. 23, 1954, 3:15-3:30 p.m., EST
"Adventures in Science" with Watson Davis, director of Science Service, over the CBS Radio Network. Check your local CBS station.
Dr. Curtis F. Culp, director of medical services, National Foundation for Infantile Paralysis, will discuss "Vaccinating Against Polio."

VETERINARY MEDICINE

Blue Tongue, Sheep Virus Spread by Common Gnat

► **BLUE TONGUE**, a dreaded virus disease in sheep, may be spread by common gnats.

Dr. D. A. Price, veterinarian at the Sonora Substation of the Texas Agricultural Experiment Station, reported recently that during an experiment Sonora workers produced the disease by injecting sheep with an emulsion prepared from gnats collected in that area.

A virus disease once thought to exist only in South Africa and on the island of Cyprus, blue tongue now is believed to have existed in the United States for at least 20 years.

First reported as "soremuzzle" by Texas workers in 1952, the disease was found to be widespread in 1953. It was recognized in California and specimens sent to South Africa gave positive identification. Dr. Price says that one strain has been isolated and vaccine tests are being made in an effort to find a vaccine similar to the one used successfully by South Africans.

Recent research indicates there are at least three strains in Texas. These pose immense problems in isolating each and preparing a vaccine for its control. Although natural infection or vaccination provides lifelong protection against one strain, it does not necessarily protect against others.

The U. S. Department of Agriculture's interest in Dr. Price's finding is shown by a survey to classify carrier gnats in the Southwest. The survey is being performed by the Bureau of Entomology and Plant Quarantine at the request of the Bureau of Animal Industry.

Science News Letter, January 16, 1954

HORTICULTURE

Best Plant Slips Come At Non-Flowering Season

► **TO HAVE** plants grow from cuttings of roots or stems, make them at a time when the plant is not flowering.

Experiments reported by Dr. J. Dore of the University of Southampton's botany department in *Nature* (Dec. 26, 1953) show that the regenerating capacity of horseradish cuttings is low during the months of flowering.

Older studies showed that of 12 kinds of plants, only two actually regenerate best during flowering, while five regenerate most efficiently before and five best afterwards.

Science News Letter, January 16, 1954

ASTRONOMY

Find New Value for Length of Martian "Day"

► A NEW value for the length of the Martian "day" has been found by Dr. Joseph Ashbrook of Yale Observatory, New Haven, Conn. It takes the "red" planet 24 hours, 37 minutes and 22.6679 seconds to make a complete rotation, his calculations, the first in nearly 50 years, show. This is 137 ten-thousandths (0.0137) of a second longer than the presently used value.

Mars, now visible in the southeastern sky a few hours before sunrise, is the only planet besides the earth whose rotation period now can be accurately measured. Dr. Ashbrook was interested in finding out whether or not Mars, like the earth, has measurable changes in rotation.

According to Dr. Dirk Brouwer, also of Yale Observatory, the earth's rotation during the decade from 1901 to 1910 took 64 ten-thousandths (0.0064) of a second longer than it did in the period from 1866 to 1875.

Since Mars is making extremely close approaches to the earth in 1954 and 1956, Dr. Ashbrook suggests in the *Astronomical Journal* (Aug., 1953) that further photographs at these times would give an even more accurate rotation period for the "red" planet.

Science News Letter, January 16, 1954

MEDICINE

Urge Anti-Tetanus Shots for Horsemen

► GROWN-UPS WHO ride horses all year round and who are frequently in stables should be protected against tetanus, or lock-jaw, by "shots" of tetanus toxoid followed by booster "shots," the *Journal of the American Medical Association* (Jan. 2), advises.

Booster doses can be given at intervals of one to two years or at the time of an injury. Booster doses are effective for as long as 10 years after the basal immunization. If there is delay in prophylaxis with tetanus toxoid booster "shots," severe injury, marked physical weakness or blood loss, or a doubtful history of the immunizing toxoid injections, tetanus antitoxin is needed in addition to booster injections.

Science News Letter, January 16, 1954

VETERINARY MEDICINE

Once Rare Disease Potential Meat Threat

► OUR MEAT and milk production are potentially threatened by a disease once so rare that it was hardly known in this country three years ago, according to the American Veterinary Medical Association.

The disease, called leptospirosis, attacks cattle, swine and horses. It has now been diagnosed in cattle in 40 states and serious outbreaks among swine have been reported in almost all leading hog raising areas, the association finds.

Leptospirosis causes breeding failures, kills some young animals, stunts others, and reduces meat and milk production. It can also become a public health problem.

Symptoms are widely varied, making diagnosis difficult.

Milk pasteurization and current U. S. Bureau of Animal Industry meat inspection standards are adequate to safeguard the interests of the public, association officials said. However, they pointed to a need for "better implements for diagnosis and control and a thorough understanding of the factors which influence this disease."

Science News Letter, January 16, 1954

INVENTION

Develop Nuworld, An American Cheese

► NUWORLD, AN entirely new cheese variety, has been market tested and will be made available to housewives throughout the United States in the near future.

It is a cheese of light cream color, soft buttery texture at room temperature, a flavor described as neither sharp nor mild, and an ability to blend with other foods smoothly and quickly.

Nuworld was given its name because of its American origins. It is reported to be superior in some respects to the traditional cheese types of Old World origin.

It is an outgrowth of the development in 1942 of new cheese-producing organisms by Prof. S. G. Knight of the University of Wisconsin, tested in the University of Minnesota laboratories of Profs. W. B. Combs, J. J. Jezeski and Howard A. Morris.

Patented by the non-profit Wisconsin Alumni Research Foundation, proceeds from the patent will be turned back into scientific research.

Science News Letter, January 16, 1954

ANIMAL NUTRITION

Antibiotics Control Digestive Organisms

► ANTIBIOTICS IN feed make chickens and hogs grow faster by controlling intestinal organisms that "steal" nutrients in the feed from the animals, University of Wisconsin researchers think.

Experiments have shown that the antibiotics cause important changes in the types and numbers of bacteria in the small intestines of animals.

When they were added to complete rations, however, antibiotics did not increase chick growth. When the feed was short of the vitamin thiamine, the drugs were very effective. When a small amount of thiamine was injected directly into the blood of the animal, growth was speeded up without the drug.

The scientists believe that intestinal organisms retard growth by stealing vitamins and nutrients from the animals.

Science News Letter, January 16, 1954

IN SCIENCE

PEDIATRICS

Infant's Body Growth Competes With Activity

► WHEN AN infant's body is growing in size and weight most rapidly, its growth in integrated activities like control of the body and limbs is slowest, Dr. Emma H. Collins, Stritch School of Medicine, Loyola University, Chicago, has reported.

Dr. Collins advances the theory that the human infant has available only a certain amount of energy for which body growth and activity growth compete.

The last three months of the prenatal period and the first six months of infancy is the most rapid time of body growth. During this period there is a minimum of integrative growth or activity in progress, she said.

As body growth slows down, the child gains control of the movements of its body and begins to talk. Dr. Collins suggested in her report to *Growth* (Sept., 1953) that the term infancy be extended to include the first three years of postnatal life.

Science News Letter, January 16, 1954

ASTRONOMY

New Member of Our Astronomical Family

► THE EXISTENCE of a possible new member of our local astronomical family of galaxies is reported by Dr. Harlow Shapley of Harvard College Observatory as the result of his continuing researches on the borders of the great expanse of stars that we see in the sky as the Milky Way.

The suspected new member is a spiral nebula, known as NGC 2427, heavily shrouded in a heavenly haze of absorbing material. It is located in the constellation Puppis at longitude 227 degrees and latitude minus 12 degrees.

The Milky Way is the galaxy to which we are directly affiliated since our sun is a star within it. In the region of space that we occupy, that is, within a volume that 186,000-miles-per-second light can cross in about two million years (it was a million years until the universe's yardstick was doubled recently) there are seven other galaxies or star aggregations: The Andromeda nebula, or Messier 31 galaxy, its two companions, Messier 32 and NGC 205, the giant Messier 33, and the two Magellanic Clouds, and now the possible new one, NGC 2427. There are also nine dwarf nebula, but they hardly count as full-fledged members of our family of galaxies.

With Miss Ann B. Hearn, Dr. Shapley has communicated the details of the new findings to the American Astronomical Society.

Science News Letter, January 16, 1954

ICE FIELDS

MARINE BIOLOGY

Antarctic Whale Season Opens for Seven Nations

► WHALING EXPEDITIONS from seven nations started catching fin whales in the Antarctic Ocean when the international whaling season opened on Jan. 2.

The United States, once a leader in the whaling industry, has no expeditions this year though this country ratified the International Whaling Convention which has governed whaling since 1935.

The season for the valuable blue whale opened Jan. 16. This year's catch will be limited to 15,500 blue-whale units. This is a standard measurement in which one blue whale, two fin whales, two and a half humpback whales or six sei whales make one blue-whale unit. This year's limit is 500 less than last year.

Nine of the 18 expeditions this season are from Norway. Other nations represented are Japan, England, South Africa, The Netherlands, the Soviet Union and Panama.

A total of 210 whale catchers, 105 from Norway, is operating this season. This is 20 fewer catchers than last year. The catchers take the whales to the factory ships for processing after harpooning and killing them.

An agreement to reduce the number of whale catchers has been made and signed by all companies except the Soviet company.

The reduction in the number of whale catchers will not reduce the whale-oil production, but will make the season longer, experts predict. Whale-oil is used in Europe and Japan to make butter substitutes like margarine and soap.

As a special part of the season, Norwegian, British and Dutch whale research scientists are aboard a catcher marking whales in order to get more information about whale movements and total numbers.

Science News Letter, January 16, 1954

GENERAL SCIENCE

Medical Journal Adopts Summaries in Interlingua

► DESCRIBED AS "a major breakthrough in the great barrier of language," the internationally-read medical journal, *Blood*, has announced that summaries of all of its articles will appear, beginning with the January issue, in the new scientific "supranational" language, Interlingua.

"Translated abstracts in one or another language have appeared in scientific periodicals before," Henry M. Stratton, president of Grune & Stratton, publishers of *Blood*, explained. "They have performed an important service in a limited way to limited

groups. The new Interlingua summaries, however, represent a more ambitious and more telling attack on this obstacle. I am sure the use of this new scientific language will spread and spread rapidly, now that *Blood* has pioneered the example."

Dr. William Dameshek, editor-in-chief of *Blood*, the *Journal of Hematology*, and clinical professor of medicine at Tufts College Medical School, Boston, states editorially:

"The development of a common international tongue such as Interlingua may not only aid in the means of communication between scientific groups, but in the gradual filtering down of the good-will engendered there to the masses of the people in general."

Science News Letter, January 16, 1954

BIOPHYSICS

Radioactive Hormone Available for Research

► CORTICOSTERONE, adrenal gland hormone relative of arthritis-relieving cortisone, is now available in radioactive form for scientific research, the Public Health Service's National Institute of Arthritis and Metabolic Diseases has announced.

The radioactive hormone, although in limited supply, is available free of charge to qualified investigators. It was made with radioactive carbon from the U.S. Atomic Energy Commission by biosynthesis at the Worcester, Mass., Foundation for Experimental Biology, utilizing progesterone prepared by Charles E. Frosst and Company.

Because it is radioactive, scientists using it in research will be able to trace its course through the body and learn more about how and where this hormone carries on its vital functions.

Science News Letter, January 16, 1954

CHEMISTRY

Find New Method for Study of Water Eddies

► A NEW method for finding out how eddies form when a boat or submarine moves through water has been devised by Dr. S. Koncar-Djurdjevic of the Institute of Inorganic Technology, Belgrade, Yugoslavia.

Using this method, scientists can study what they call "fluid flow," such as water running out of faucets or through pipes in your house, or the meandering of rivers and streams. The flow is investigated by placing objects coated with silica gel in a water stream containing a very small amount of blue dye. The amount of dye that coats on different places of the object's surface is a measure of how the water passed over it, and how it forms eddies.

Dr. Koncar-Djurdjevic says in *Nature* (Nov. 7, 1953) that his adsorption method has several advantages over those now in use. It gives permanent records without need for photography, it is simple and can be applied to large surfaces.

Science News Letter, January 16, 1954

PUBLIC SAFETY

Women Drivers Differ From Men: They Do Better

► THE IDEA that men and women have the same driving characteristics and habits is wrong. The women do better.

A research team from the Iowa State College, consisting of Dr. A. R. Lauer, Elmer B. Siebrecht and Charles F. Schumacher, reported to the American Association for the Advancement of Science meeting in Boston that:

1. One woman in nine has an accident record and only about one in 25 has a violation record, whereas for men the figures are one in four for both accidents and violations.

2. Proportion of women drivers is increasing in the population; one in four in 1951 and nearly one in three in 1953.

3. Younger women have fewer accidents than older women, while the older men have better driving records than young men.

4. Annual mileage for women on the average runs about one-third that for men. Women have fewer years of driving experience. Women drive only about 20% of the annual mileage of the nation.

The studies were aimed at a practical system for judging driving efficiency.

A new index of accident susceptibility was proposed by the scientists to take into consideration the experience of the driver and the mileage driven each year.

Science News Letter, January 16, 1954

ASTRONOMY

Rocket-Like Ejection From Around Hot Stars

► THE TREMENDOUS rushing of gas and dust in interstellar space is due to a rocket-like ejection of material from around very hot stars.

Dr. Lyman Spitzer Jr., director of the Princeton University Observatory, N. J., presented this theory in the seventh Henry Norris Russell lecture at the American Astronomical Society meeting in Nashville, Tenn. Expansion of "hot spots" in regions around very hot stars, he said, may result in the turbulent velocities of the vast, interstellar clouds of gas and dust.

He explained what he called the "natural rocket" effect this way:

"A dense cloud of neutral hydrogen constitutes a natural rocket when placed near a luminous star of high surface temperature. The stellar radiation heats up the cloud, on the side facing the star, to about 10,000 degrees [absolute].

"The heated material expands, and shoots away from the cloud; since only one side is heated, the gas will stream away predominantly in one direction, towards the hot star. The recoil from this stream of gas will then accelerate the [remainder of the] cloud away from the star."

Science News Letter, January 16, 1954

BIOLOGY

Virus Cell Reproduction

\$1,000 AAAS prize awarded for concerted attack on key problem in biology, the biochemical processes which enable living cell to reduplicate original.

See Front Cover

► A CONCERTED experimental attack on what is probably the key problem in biology, the biochemical processes which enable a living cell to produce new living material which reduplicates the original, won for Dr. Barry Commoner of Washington University, St. Louis, the \$1,000, 26th Newcomb Cleveland prize of the American Association for the Advancement of Science at Boston.

This process is the fundamental basis of all reproduction. Tobacco mosaic virus offers certain key advantages for experiments designed to penetrate the secret of this still unmastered problem. This virus is capable of being reproduced.

When a very minute amount of the virus is inoculated into a tobacco leaf, within a matter of days large amounts of new virus appear in the infected tobacco cells. In this respect, the virus behaves like any other reproducible part of the cell, such as a chromosome.

The virus also resembles the agents of normal inheritance in that, like the chromosome, it also exerts a profound influence over the chemical and other characteristics of the cell. So, when a tobacco plant is infected with the virus, the flowers produced are streaked with color instead of showing the solid color of a normal flower. The shape and color of the leaves are also affected.

No Direct Cell Relationship

For these reasons scientists have come to regard viruses, such as tobacco mosaic, as sort of free-wheeling genetic agents which, once inserted into an appropriate living cell, are able to imitate very closely the behavior of the cell's ordinary reproductive machinery. The virus acts, however, without any direct relationship to the cell's nucleus.

Unlike the ordinary reduplicating agents of the cell, tobacco mosaic virus possesses certain very important experimental advantages which permit biochemical experiments that cannot as yet be accomplished with agents such as those found in the chromosomes.

Tobacco mosaic virus can be taken out of the infected cell and isolated as a pure single substance—a nucleoprotein. As such, it can be kept in solution for years, and most important, will still be capable of being reproduced if put back into a tobacco cell.

The fact that the virus can be taken out of the cell, handled as a chemical, and then

put back into the new cell without losing its biological powers is what distinguishes it from the cell's own reproductive agents, and leads to the enormous experimental advantages.

Dr. Commoner's research efforts have been designed to take advantage of these experimental opportunities, and to find out, in precise chemical terms, the specific processes which occur inside the cell when the virus is reproduced. The experiments have involved a large degree of teamwork and are the product of the efforts of a number of collaborators and students.

Dr. Commoner stressed the fact that many of the experiments would have been impossible for one or two persons to carry out alone.

The fundamental approach, adopted by Dr. Commoner and his collaborators at Washington University, was to make detailed quantitative comparisons between the biochemical processes which go on in otherwise identical pieces of infected and uninfected tobacco leaf. By comparing the chemistry of the two tissues, it is possible

to sort out from the complex scramble of cellular metabolic processes, those specific reactions which are linked to the reproduction of the virus.

Since the chemical composition of the virus is so well known, it is possible to scan the metabolism of the infected cell to find out from where the material required to form the new virus comes, and what biochemical processes are involved in its final assembly into virus. Dr. Commoner and his associates found that the new virus formed in an infected cell is made from the simplest form of nitrogen available to the cell. This is ammonia. The cell avoids the use of ready-made intermediates, such as amino acids and proteins.

Isotopic Nitrogen Tracer

By using isotopic nitrogen as a tracer, it was shown that the virus is not produced in a single synthetic operation, but by assembly of previously synthesized subunits. The first subunit formed is the nucleic acid component of the virus. A little later, several separate units of the protein of the virus are formed. Finally, the nucleic acid and protein units are assembled to form the rod-shaped nucleoprotein molecule which is the actual virus.

It was discovered that the infected tobacco



TOBACCO MOSAIC VIRUS—Enlarged approximately 55,000 times, this electron micrograph shows the molecules of this reproducible virus, which is regarded by scientists as a sort of free-wheeling genetic agent.

cell makes a small amount of protein which may represent free protein fragments of the virus. These proteins were found to be close relatives of the virus, because of their ability to react with the blood of rabbits which had been immunized against the virus.

Dr. Commoner pointed out that this early information constituted only part of what was needed to be known about the biochemistry of virus reduplication. He stated that reduplication can be thought of as two consecutive processes: (1) The cell is instigated to set up the biochemical apparatus required to make the virus. This apparatus is lacking in the normal cell and is induced in the infected cell by the entry of the virus. (2) Once established the new synthetic machinery goes into action and produces virus which is identical with the molecules which served as the original stimulus for the cell.

Biochemical Mystery

The greatest mystery in this process is how the entering virus actually determines that the biochemical machinery of the cell shall produce a nucleoprotein which is the replica of the virus.

This question is the fundamental problem of all biological reduplications. Dr. Commoner pointed out that, to accomplish this basic effect on the infected cell, the entering virus must somehow leave an impression of its own specific chemical composition on the chemistry of the tobacco leaf. He stated that he and his colleagues had kept a sharp lookout in all their experimental work for any chemical change in the infected cell which seemed to imitate the composition of the invading virus. Until recently no such effect was noted.

However, in recent studies of the changes in the nucleic acid composition of the leaf during the infection process, the first break in this problem occurred—it was found that the infected cell synthesized new nucleic acid which, while not identical to the nucleic acid of the virus, bore a simple numerical relationship to it.

This discovery indicates that the invading virus imprints the structure of its own nucleic acid on the nucleic acid-synthesizing machinery of the host. It suggests that this event is the key to the question of how the virus is able to redirect the chemical ma-

chinery of the host cell toward the making of virus instead of normal protein.

This new information opens the way for new studies which should in time spell out in specific chemical terms the exact way in which the virus exerts this influence over the nucleic acid metabolism of the tobacco leaf. Dr. Commoner stated that this information ought to shed a good deal of light on the general question of virus reduplication, and on the more general problems associated with the growth and reduplication of cells.

Incomplete TMV Fragment

The two electron micrographs—one on the cover of this week's SCIENCE NEWS LETTER and one on page 42—show, at approximate magnification of 55,000 times, the molecules of tobacco mosaic virus, or TMV, (opposite page) and of the new non-virus protein B8 (front cover).

Protein B8 is produced by polymerization of a small protein which is found in TMV-infected tobacco leaves, but which is absent from normal tobacco. Results suggest that this non-virus protein may represent an incomplete fragment of the TMV protein.

The fact that the non-virus protein may be polymerized to form protein B8 which resembles TMV closely in size and shape is support, *but not proof*, of this idea. Other non-virus proteins have also been found

associated with TMV infection but electron micrographs of these have not yet been obtained.

Protein B8 is a close immunochemical relative of TMV in that it will react with anti-sera prepared by injecting rabbits with purified virus. Conversely, TMV will react with anti-sera prepared by injecting protein B8 into rabbits.

Dr. Commoner's work has already led to the discovery that a drug, thiouracil, which imitates the structure of a key component of virus nucleic acid is an infection suppressor of tobacco mosaic virus reduplication. Such information serves to stimulate the search for drugs which may be effective against other viruses.

Dr. Commoner placed special emphasis on his conviction that the importance of the investigations carried out by his group was that they were directed toward finding the answers to broad, general questions of how living things reproduce. He pointed out that this type of investigation is the essential requirement for progress on all fronts of science.

The investigations were supported by research grants from the National Foundation for Infantile Paralysis, and the American Cancer Society and the Lederle Laboratories.

For earlier reports on the work of Dr. Commoner and his associates, see SCIENCE NEWS LETTER, Jan. 10, 1953, p. 25.

Science News Letter, January 16, 1954

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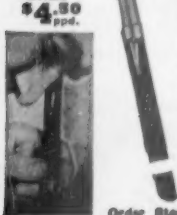
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Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

ADVANCES IN ELECTRONICS: Volume V—L. Marton, Ed.—*Academic Press*, 420 p., illus., \$9.50. This volume contains a cumulative index of authors and subjects for all five volumes. It includes a review of recent work in color television and a study of junction transistor applications.

THE ATOMIC SUBMARINE AND ADMIRAL RICK-OVER—Clay Blair, Jr.—*Holt*, 277 p., illus., \$3.50. This book carries the stamp of the Department of Defense "No objection to publication on grounds of military security." It is the story for the public of the development of the first atomic powered submarine as well as of the conflicts, jealousies, wire-pulling and office politics that resulted from it.

DIABETIC CARE IN PICTURES: Simplified Statements With Illustrations Prepared for the Use of the Patient—Helen Rosenthal and Joseph Rosenthal—*Lippincott*, 2d ed., 164 p., 128 original illustrations, \$3.00. Demonstrating clearly the details of diet, the administration of insulin, sterilization of the hypodermic syringe, and tests of blood and urine.

EARLY PHASES OF PERSONALITY DEVELOPMENT: A Non-normative Study of Infant Behavior—Sibylle Escalona and others—*Child Development Publications*, 72 p., paper, \$1.00. A cross-sectional study of 128 infants ranging in age from four weeks to thirty-two weeks.

THE EFFECT OF ACTH AND CORTISONE UPON INFECTION AND RESISTANCE—Gregory Schwartzman—*Columbia University Press*, 204 p., illus., \$5.50. Papers, presented at a symposium, that throw light on the nature and action of these new medical weapons.

FASTER THAN THOUGHT: A Symposium on Digital Computing Machines—B. V. Bowden, Ed.—*Sir Isaac Pitman (Pitman)*, 416 p., illus., \$8.50. A readable book on the new electronic "brains" with emphasis on what is being done in England. Included are accounts by the designers of practically every such machine built in England in 1951. Included also is an account of a computing "engine" developed by Babbage over 100 years ago.

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FIBERS: Opinions and Practices Among Manufacturers of Cordage and Twine—Rita Hausnecht and Ben L. Owens, Study Directors—*Govt. Printing Office, USDA Marketing Research Report No. 51*, 98 p., paper, 45 cents. Sisalana, cotton and abaca account for almost three-fourths of the total poundage used in cordage products; henequen and jute account for most of the rest.

FUNDAMENTALS OF RESERVOIR ENGINEERING—John C. Calhoun, Jr.—*University of Oklahoma Press*, 417 p., illus., \$6.00. Republication in book form of a weekly page that appeared in the *Oil and Gas Journal*.

GOING AHEAD TOWARD BETTER HEALTH AND LONGER LIFE—*Metropolitan Life Insurance Company*, 24 p., illus., paper, free upon request direct to publisher, 1 Madison Ave., New York, N. Y. Reporting the activities of the company in promoting public health, and battling accident and disease.

MEDICAL RESEARCH MAY SAVE YOUR LIFE!—Gilbert Cant—*Public Affairs Committee, Public Affairs Pamphlet No. 201*, 28 p., illus., paper, 25 cents. To move at full speed against persistent, disabling illness, the author estimates that we shall need to spend about \$550,000,000 a year for medical research. We now spend about one-third this amount.

PATENTS . . . PROGRESS . . . AND PROSPERITY—William R. Ballard—*National Association of Manufacturers*, 20 p., paper, free upon request direct to publisher, 14 West 49th St., New York 20, N. Y. Explaining the workings of our patent system.

THE PERSONNEL ADMINISTRATOR AT THE CROSSROADS: Meeting the New Challenges of Personnel Management—John Post and others—*American Management Association, Personnel Series*, Number 153, 54 p., paper, \$1.25.

THE PET SHOP MANUAL—Joseph B. Roberts, Jr.—*All-Pets Books*, 94 p., illus., \$2.50. If you love animals and have decided to open a pet shop, this book is intended to furnish you with the information you need.

THE PETROLEUM INDUSTRY IN KANSAS—Edwin D. Goebel—*University of Kansas Publications*, 1 map, 25 cents mailing charge.

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RIGHT-OF-WAY PROBLEMS—David R. Levin and others—*Highway Research Board*, Bulletin 77, 72 p., illus., paper, \$1.05. Discussion in this bulletin also includes problems of roadside control and parking.

ROGER BACON IN LIFE AND LEGEND—E. Westcott—*Philosophical Library*, 140 p., \$3.75. A compact story of the facts and fiction about Roger Bacon's life, including his studies of science and alchemy.

SCIENTIFIC TESTS, STANDARDS—Superintendent of Documents—*Govt. Printing Office*, Price List 64, 36th ed., 63 p., paper, free upon request direct to publisher, Washington 25, D.C. Showing the availability of stock on this subject at the time of going to press.

SCIENTISTS' RIGHTS, DROIT DES SAVANTS—*United Nations Educational, Scientific and Cultural Organization (Columbia)*, UNESCO Copyright Bulletin, Vol. VI, No. 2, 111 p., paper, \$1.25. Discussion of rights of scientists to their discoveries aside from copyrights and patents is summarized as developed in UNESCO and the earlier League of Nations Organizations. The report, appearing in English and French, admits that the problem is not easy to solve.

STRUCTURAL EFFECTS OF HEAVY-DUTY TRAILER ON CONCRETE PAVEMENT: A Supplemental Investigation to Road Test One—Earl C. Sutherland and Harry D. Cashell—*Highway Research Board*, Special Report 14, 32 p., illus., paper, 60 cents. The damage done

to the pavement depends partly on the position of the loaded trailer with relation to the edge of the pavement.

THE SUN—Gerard P. Kuiper, Ed.—*University of Chicago Press*, 745 p., illus., \$12.50. The first of a four-volume series on the solar system.

This authoritative work is intended as a reference handbook for the astronomer, but is written to be intelligible to the layman familiar with the physical sciences. The four volumes will be written by 56 authors in 10 countries.

Science News Letter, January 16, 1954

Where Do You Want To Go?

France? Brazil? West Indies? Hawaii? Mexico?

Read what the *Christian Science Monitor* says about a new way to travel that sometimes costs 1/3 to 1/2 less.

BY THE travel editor of *The Christian Science Monitor*: Many fascinating travel booklets pass over this desk in the course of a year but the one that arrived the other day so interested this department that it cost the office several hours of work in order that we might absorb its content. The booklet is entitled "Travel Routes Around the World" and is the traveler's directory to passenger-carrying freighters and liners. In no time at all you find yourself far out to sea cruising along under the tropical skies without a care in the world. You find yourself docking at strange ports and taking land tours to those places you long have read about. Most interesting of the vast listings of ships are the freighters which carry a limited number of passengers in quarters comparable to the luxury offered in the so-called big cruise ships which devote most of their space for passengers.

The booklet first of all answers the question: What is a freighter? The modern freighter, says the booklet, ranks with the de luxe passenger vessels so far as comfort and accommodations are concerned.

LARGE ROOMS WITH BEDS

It is important to realize that in most cases today, freighter passengers are considered first-class passengers, although the rates charged are generally on a par with either cabin or tourist class fare. Most passenger-carrying freighters, to quote the booklet, have their private bath and shower, and these cabins offer beds, not bunks. The rooms are generally larger than equivalent accommodations aboard passenger ships, and the cabin of a modern freighter is sometimes even twice as large as first-class cabins on some of the older passenger ships. It goes without saying that your room is on the outside, and amidships, the most expensive of all locations, for which you are usually charged a premium over the advertised minimum fares on passenger ships.

This booklet points out that it is frequently astonishing how low freighter fares are as compared with passenger ship fares; for example, less than one-half of the passenger ship fare to California is the amount asked on freighters. On most of the longer runs, the difference in favor of the freighters is regularly from a third to half of the passenger ship fare.

SERVICE AND MEALS RATED EXCELLENT

Service and meals on a freighter leave little to be desired. You will be treated with consideration. Stewards will go out of their way to make your voyage pleasant. On ships with East Indian stewards you will be waited on almost hand and foot, in a manner that is completely unknown to Americans and most Europeans.

Foreign ships offer their own specialties, says the booklet. Thus vessels in the East Indian trade serve Rijkstafel (or King's Table), the East Indian dish which can run to as many as 50 different courses. Scandinavian ships serve Smorgasbord every day, and some of their desserts (like strawberries smothered in a huge bowl of whipped cream) are never forgotten. Another feature of freighter travel is in its informality. No formal clothes are needed. Sport clothes are enough.

Other valuable information such as how to tip, shipboard activities and costs are covered in the booklet, "Travel Routes Around the World."

Some of the trips listed include a trip to England for \$160, a 12-day Caribbean cruise for \$240, or a leisurely three-month Mediterranean voyage.

The booklet is published by Harian Publications, Greenlawn, New York, and may be obtained by sending to the publisher.

So, when it arrives all you need to do is sit down and take your choice. The booklet lists literally hundreds of ocean trips.

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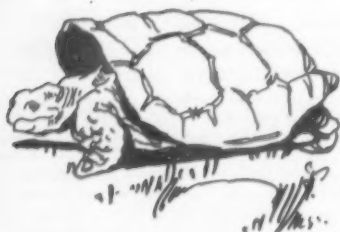
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BIOLOGY

NATURE RAMBLINGS



Man Outlives Animals

► EXCEPT FOR a few species of giant tortoise—and who wants to be a tortoise?—man lives the longest life of any animal on the face of the earth.

Threescore years and ten was the lifetime assigned to man by the Psalmist, and that is still counted a fair old age after 30 centuries. And just as David and other Old Testament writers lamented the brevity of human life, people today feel that 70 years

is not enough, and envy animals reputed to reach extreme ages of 300 or 400 years.

If there is any consolation in living longer than other creatures, we have it. Our seven decades, short though they seem, really represent a longer life span than that of all except some species of giant tortoise.

Among his nearest animal kin the warm-blooded mammals, man is easily the patriarch.

Old legends die hard, and the idea that man is the longest-lived of warm-blooded creatures will be disputed by many. Nevertheless, this view is supported by a careful examination of all really verifiable records, made by many zoologists and collated by R. Marlin Perkins, director of the Lincoln Park Zoo in Chicago. A considerable share of his figures come from Maj. Stanley Smyth Flower of the Zoological Society of London, the rest from American zoological parks.

All figures represent extreme ages reached by animals in captivity. There are no reliable figures for the life spans of wild animals, but it is probable that most of them are shorter than the limits attainable in captivity. The relentless law of the jungle, that killers eat the old and the weak first, would seem to take care of that.

Three animals that are often reputed to outlive man by many years, even to fantastic limits, are elephants, parrots and the giant tortoises of the Galapagos islands. Actually, the greatest surely known age for an elephant is 60 years, with an average life expectancy of 45. The oldest parrot on record died at 54; other parrots have lived to be nearly 50. Cockatoos, closely related to parrots, reach ages between 30 and 40 years.

Only the tortoises outlive man, though

the claims of 300 years and more cannot be authenticated. The Galapagos tortoise is known to live more than 100 years; another species, Marion's tortoise, holds the record at 152 years. Size does not have any necessary correlation with age: the little Carolina box turtle has been known to live as much as 123 years, whereas the big, mean-tempered alligator snapping-turtle can claim only 42. Also, the loggerhead, a sea turtle that rivals or surpasses the Galapagos tortoises for size, doesn't quite make the 40-year mark.

Science News Letter, January 16, 1954

DENTISTRY

Combat Dentist's Drill Inspired by Toy Train

► A POCKET-SIZED dentist's drill resembling an aluminum ball-point pen has been worked out at the University of Michigan to help dentists fill soldiers' teeth on the battle line. Powered by a built-in motor patterned after that of a toy electric train, the gadget goes into action when clipped to the terminals of a jeep's battery.

Science News Letter, January 16, 1954

Galileo's

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Translated by Stillman Drake
Foreword by Albert Einstein

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Questions

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□ □ □

GENETICS — What controls the number of white blood cells. p. 36.

□ □ □

GENERAL SCIENCE—What is the position of the AAAS concerning President Eisenhower's proposal on atomic energy control? p. 37.

□ □ □

SOCIOLOGY—How does rising in the social scale affect family size? p. 36.

□ □ □

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□ □ □

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❁ **WHEEL CHAIR** drive "motorizes" most standard collapsible wheel chairs so that patients with extremely limited use of their limbs can get around. Operating on a 24-volt storage battery, the device consists of two motors, one to a wheel, and a tiny, easy-to-move "joy stick" to control forward motion, reverse and steering.

Science News Letter, January 16, 1954

❁ **ANTI-FOAM AGENT** sprays from a push-button can to kill foam in chemicals and foods. Its effective concentrations of silicone usually range from 0.01 to 1.0 parts per million, far less than the 10 parts per million permitted in foods by the Food and Drug Administration. In most cases, no trace of the aerosol mist can be detected in the finished product after defoaming.

Science News Letter, January 16, 1954

❁ **DRAW CORD** for window drapes is made of cotton braided over a core of glass fibers. This yields a cord that will not stretch appreciably, thus preventing unsightly gaps from developing after the drapes have been pulled closed several times.

Science News Letter, January 16, 1954

❁ **PRIVATE-WIRE TV** system now is in production for customers who want to monitor gauges, processes, exits, prisons and



stores by remote control. The "eye" is a small four-tube camera that feeds a home-type TV receiver on any unused channel from channel two through six. It does not interfere with regular TV reception on other channels. The device is shown in the photograph.

Science News Letter, January 16, 1954

❁ **HEATING CONTROL** for large buildings, schools, apartment houses and hospitals consists of an inside control panel and an outside "weather head." The device regulates the building heat while compensating for weather, sun intensity, wind velocity and chimney draft.

Science News Letter, January 16, 1954

❁ **FOUR-PIECE SALAD** set consists of a slicer having five tempered-steel knives, a grater, a coarse shredder having 46 knives, a fine shredder having 95 knives and a glass oven-proof dish to which the grater and shredders attach. The bake dish can be used independently in ordinary cooking operations.

Science News Letter, January 16, 1954

❁ **SUCTION FAN** attaches easily to the back of a television set to draw out the hot air inside and to pull cool air in to cool the tubes and resistors. The device quietly operates only when the set is on, and is said to reduce repair bills by preventing TV overheating.

Science News Letter, January 16, 1954

❁ **FORK-LIFT TRUCK** comes equipped with an automatic brake-setter as optional equipment. When the operator climbs off the industrial machine, the seat snaps up slightly, putting on the parking brakes. Three minutes later, a time-delay relay shuts off the engine to cut maintenance costs.

Science News Letter, January 16, 1954

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Do You Know?

It is estimated that there are a million undiagnosed *diabetics* in the U. S.

Clave is the dried flower bud of a medium-sized evergreen tree that grows well only in open clearings in the humid tropics.

The 179,000 *rivets* in a modern jet fighter would tower two and a half times as high as the Empire State building if placed on top of each other.

The highest known speed of a *star* is that of a double star in the constellation of Cygnus; the star's speed is 1,500,000 miles an hour.

Bumblebees are the only *bees* that can reach the nectar in red clover.

An individual's color *vision* usually improves up to about 25 years of age, then declines gradually until about age 65.